REMARKS

This application has been carefully reviewed in light of the Office Action dated November 25, 2008. Claims 1, 3 to 7, 20, 22 to 26 and 39 remain in the application, of which Claims 1, 20 and 39 are independent. Reconsideration and further examination are respectfully requested.

Claims 1, 3, 7, 20, 22, 26 and 39 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,488,673 (Katayama), and Claims 4 to 6 and 23 to 25 were rejected under § 103(a) over Katayama in view of U.S. Patent No. 6,977,756 (Nakano). Reconsideration and withdrawal of the rejections are respectfully reqeusted.

The present invention aims to reduce the memory needed for processing image data since the quantization component quantizes only the integral portion (upper bits) of corrected image data without quantizing the decimal portion (lower bits) of the corrected image data, and a buffer stores a calculated quantization error that is to be diffused to the next pixel.

Referring specifically to the claims, amended independent Claim 1 is directed to an image processing apparatus comprising a bit connection component that connects a decimal portion of image data of a preceding pixel output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data having an integer portion of the image data of the target pixel and the decimal portion, a correction component that generates corrected image data by adding a correction value to the bit-connected image data, the corrected image data having the integer portion and the decimal portion with the added correction value, a latch component that latches the decimal portion of the corrected image data to be

connected to image data of a next pixel, a quantization component that receives an integral portion (upper bits) of the corrected image data, and quantizes the received integer portion of the corrected image data, an inverse quantizing component that inverse-quantizes the quantized integer portion of the corrected image data, and outputs an inverse-quantized data, a calculation component that outputs a quantization error based on a difference between the integer portion of the corrected image data and the inverse-quantized data, a buffer that stores the calculated quantization error, and an error diffusion component that generates a correction value to be added to input data of a next pixel by diffusing the quantization error stored in said buffer.

Claims 20 and 39 are method and computer medium claims, respectively, that substantially correspond to Claim 1.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of Claims 1, 20 and 39, and in particular, is not seen to disclose or to suggest at least the features of i) a quantization component that receives an integral portion (upper bits) of corrected image data, and quantizes the received integer portion of the corrected image data, ii) an inverse quantizing component that inverse-quantizes the quantized integer portion of the corrected image data, and outputs an inverse-quantized data, iii) a calculation component that outputs a quantization error based on a difference between the integer portion of the corrected image data and the inverse-quantized data, iv) a buffer that stores the calculated quantization error, and v) an error diffusion component that generates a correction value to be added to input data of a next pixel by diffusing the quantization error stored in said buffer.

Katayama is seen to teach an integer calculation performed in the error-to-be-distributed computing means (See Fig. 25). The arithmetic-error computer means 905 calculates arithmetic-error given by the integer calculation of the error-to-be-distributed computing means. The arithmetic-error distributing means distributes the arithmetic-error to adjacent pixels. Katayama distributes both of the error of integer portion and the arithmetic-error to adjacent pixels. Two types of errors are stored in the error storing means 908. This means that the error storing means 908 requires the same size of the storing capacity independent of whether or not the integer calculation is performed. In contrast, in the invention, the integer portion and the decimal portion are divided and are respectively processed in front of the quantization component. Katayama does not teach such a feature. Moreover, the stored error of Kayayama is different from that of the invention since, in Katayama, both the error of the integer portion and the arithmetic-error are stored, while in the invention, the decimal portion is not used in the quantization and is connected to the next pixel. Accordingly, Claims 1, 20 and 39 are believed to be allowable over Katayama.

Nakano is not seen to teach anything to overcome the deficiencies of Katayama. In this regard, Nakano discloses that a data driven type processing device has an error diffusion computing unit built therein. An error holding register is provided within the error diffusion-computing unit, and is used to successively store and update a value of error information of a pixel that is to be diffused to a neighboring pixel being processed continuously. An error data memory is provided outside the computing unit, and is used to store and update a value of the error information that is to be diffused to another neighboring pixel being processed discontinuously. The error information and the values

to be diffused are stored in a packet, and the packet is circulated for operation. However, Nakano is not seen to disclose or to suggest anything that, when combined with Katayama, would have resulted in at least the features of i) a quantization component that receives an integral portion (upper bits) of corrected image data, and quantizes the received integer portion of the corrected image data, ii) an inverse quantizing component that inverse-quantizes the quantized integer portion of the corrected image data, and outputs an inverse-quantized data, iii) a calculation component that outputs a quantization error based on a difference between the integer portion of the corrected image data and the inverse-quantized data, iv) a buffer that stores the calculated quantization error, and v) an error diffusion component that generates a correction value to be added to input data of a next pixel by diffusing the quantization error stored in said buffer.

In view of the foregoing amendments and remarks, amended independent Claims 1, 20 and 39, as well as the claims dependent therefrom, are believed to be allowable.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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